S2S4E

Climate Services for Clean Energy

Making S2S data actionable

The visualisation challenge

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This project has received funding from the Horizon 2020 programme under grant agreement n°776787.

S2S4E project context

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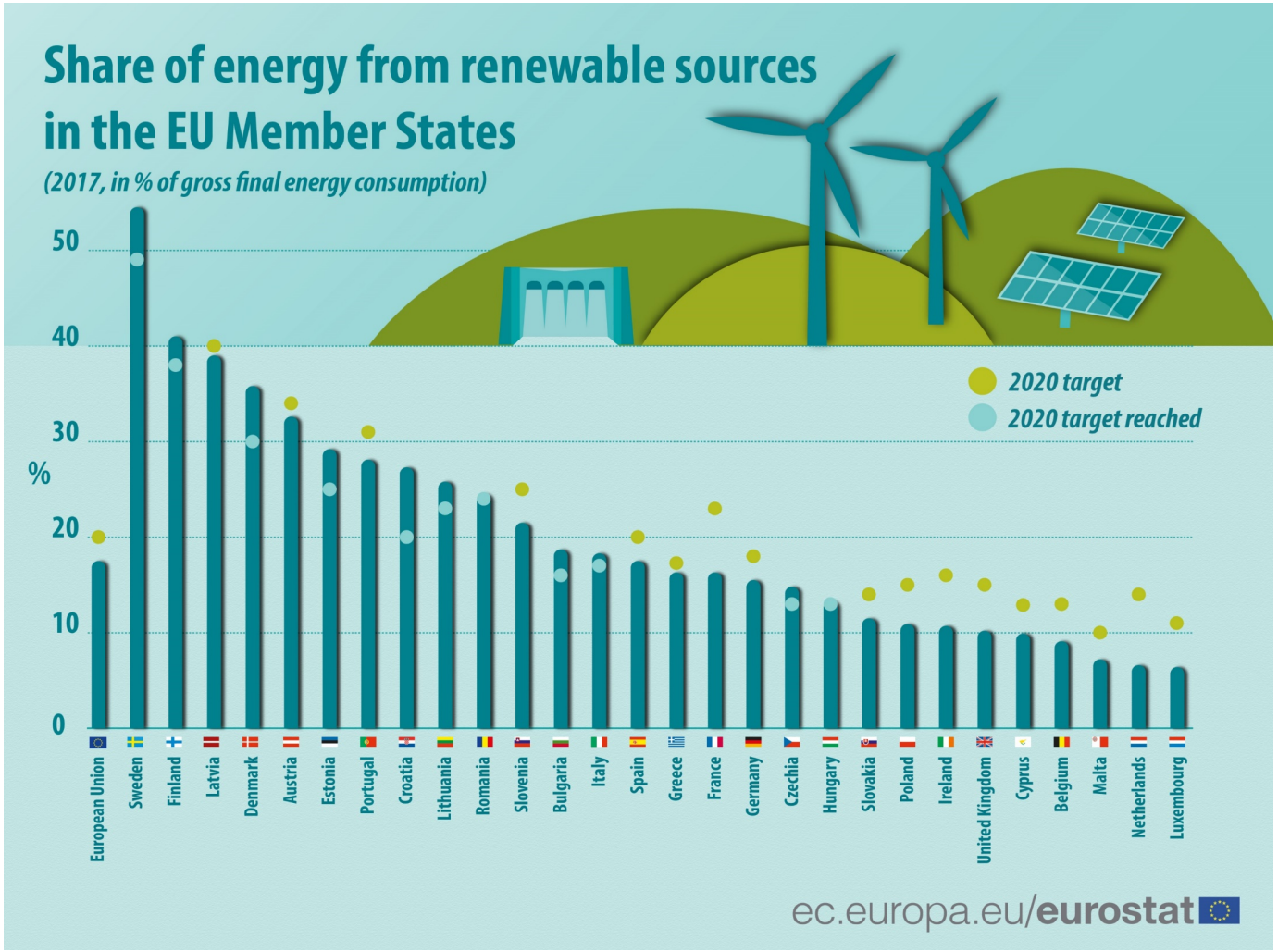
Increasing renewable energy use



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BUT

integrating renewable energy is challenging

Production and demand balance

Like 15M

Thursday, Aug 30th 2018 1PM 25°C 4PM 26°C 5-Day Forecast

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Britain's turbines are producing 40% less energy as wind 'disappears' for six weeks across the UK causing record low electricity production

- Britain got 15 per cent of its power from wind last year — twice as much as coal
- Since the start of June, wind farms have been producing almost no electricity
- The wind drought has seen July 2018 be 40% less productive than July 2017
- ...by 10% to help cover the

18 July 2018

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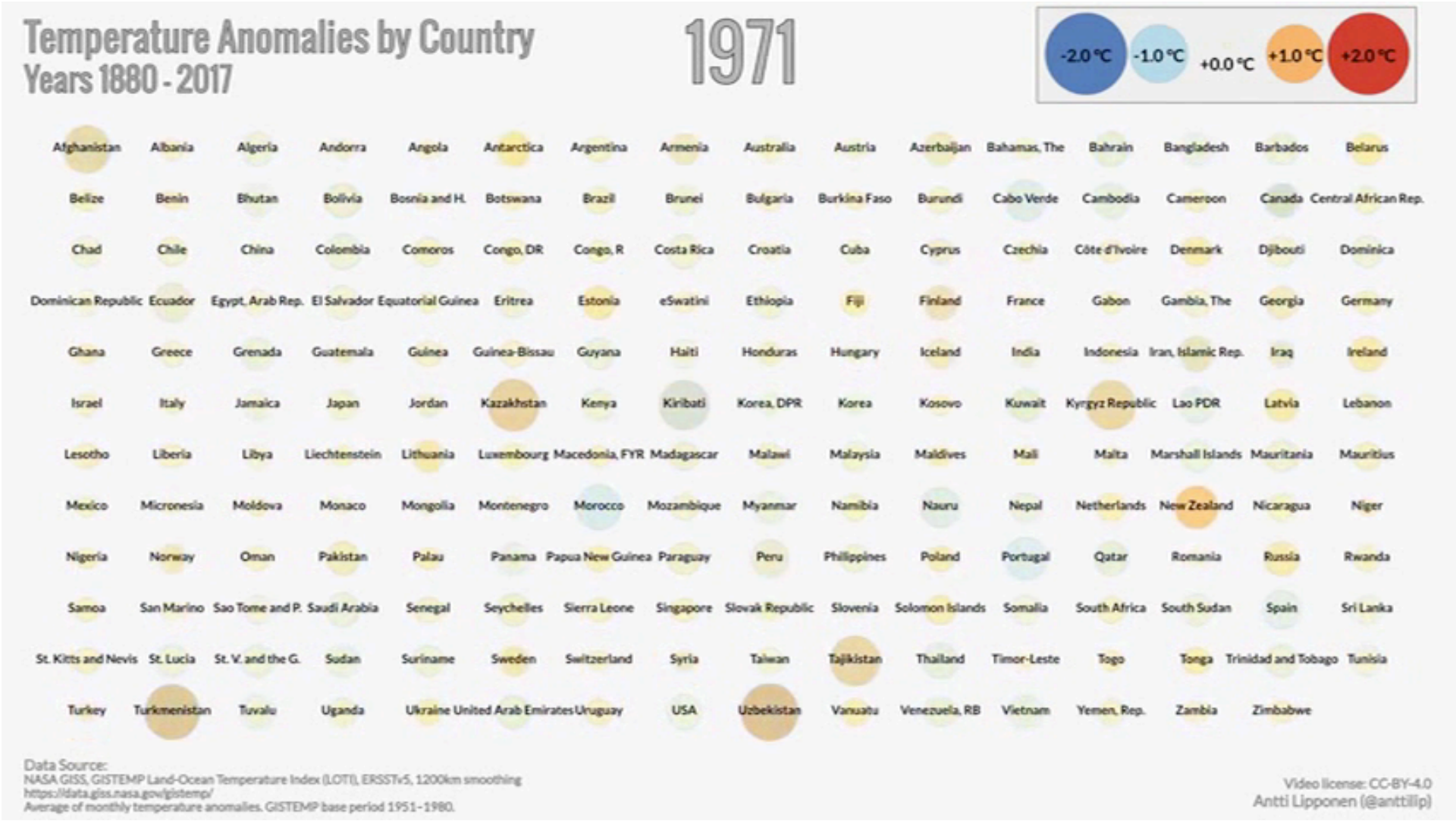
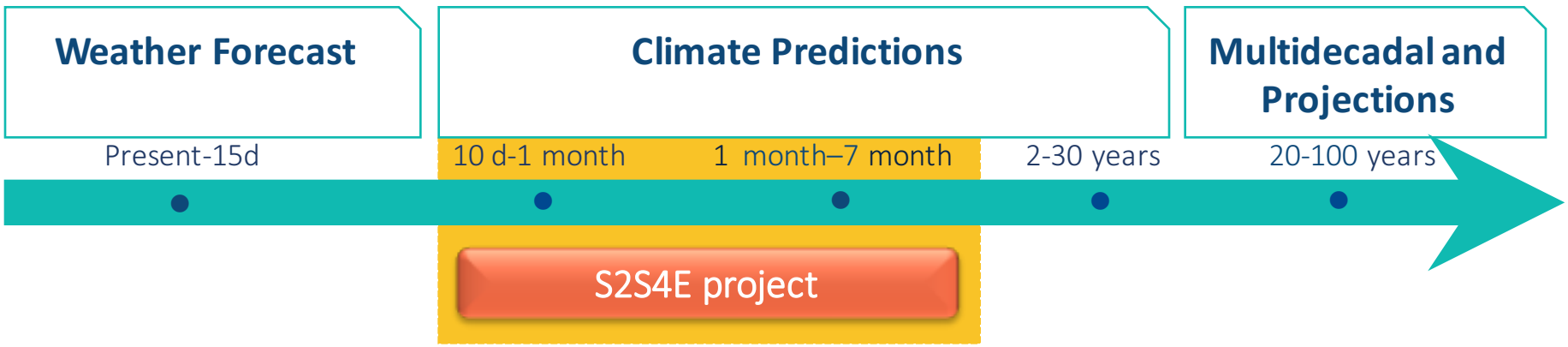
Renewable energy is a blackout risk, warns National Grid after chaos during biggest outage in a decade

… what about climate variability?



Link: https://youtu.be/PhbdyNnUliM



WIND POWER

Wind speed and capacity factor predictions

SOLAR POWER

Solar radiation and capacity factor predictions

HYDROPOWER

Prediction and changes in inflow predictions

ENERGY DEMAND

Temperature and consumption rates predictions

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Predictability weeks to months ahead

How can we predict climate for the coming season if we cannot predict the weather next week? **Slow components** (sea surface temperature, soil moisture, etc.) force the atmosphere.

Research & Innovation

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Research

- Assess available datasets of reanalyis
- Climate drivers of energy indicators
- Performance assessment of s2s forecasts systems
- Evaluation of case studies
- Weather regimes
- Conditional predictability

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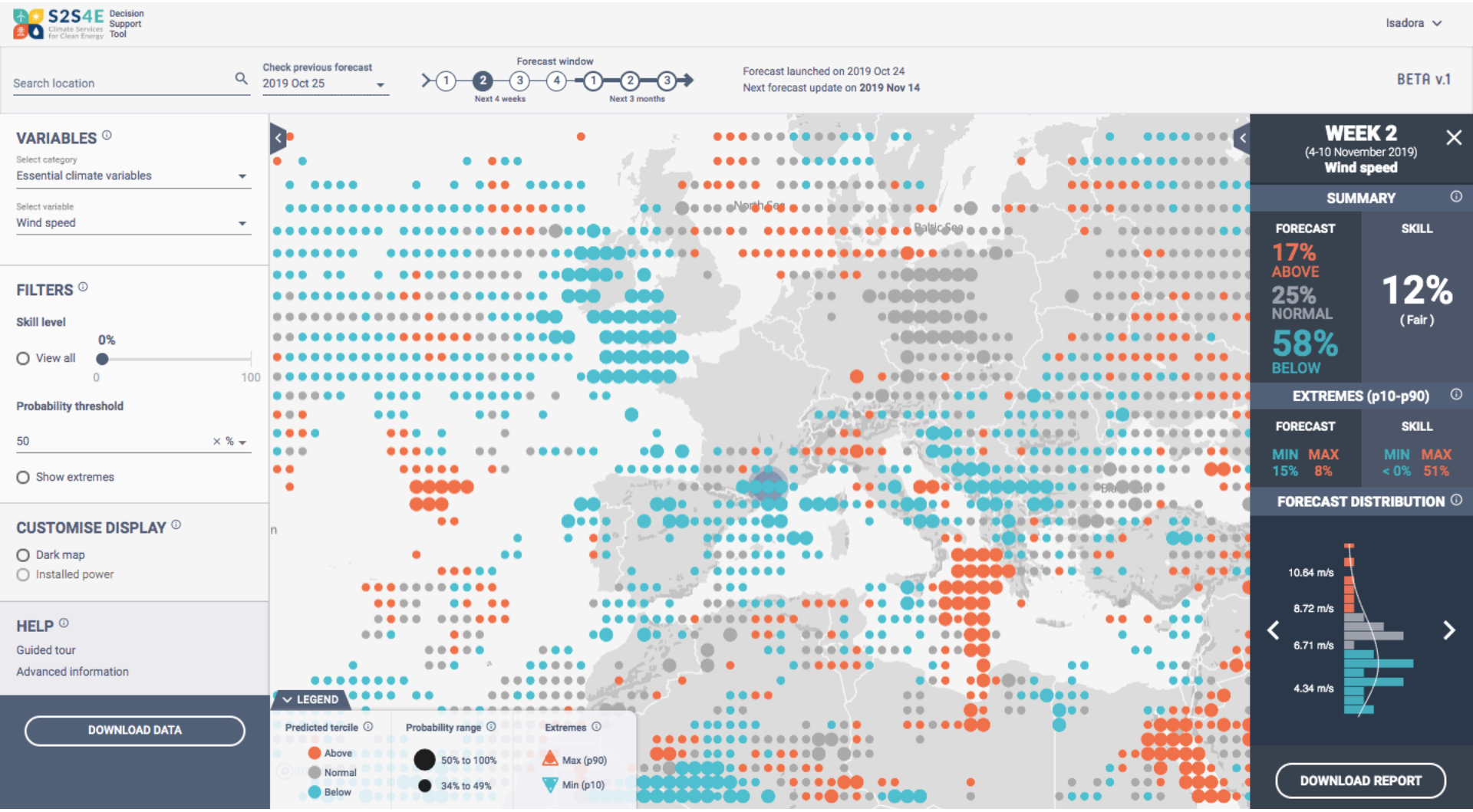
PROVIDE AN OPERATIONAL DECISION SUPPORT TOOL

DST

… WITH TECHNOLOGY READINESS LEVEL 7 (TRL 7)

Decision Support Tool



https://s2s4e.eu/dst

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Decision Support Tool

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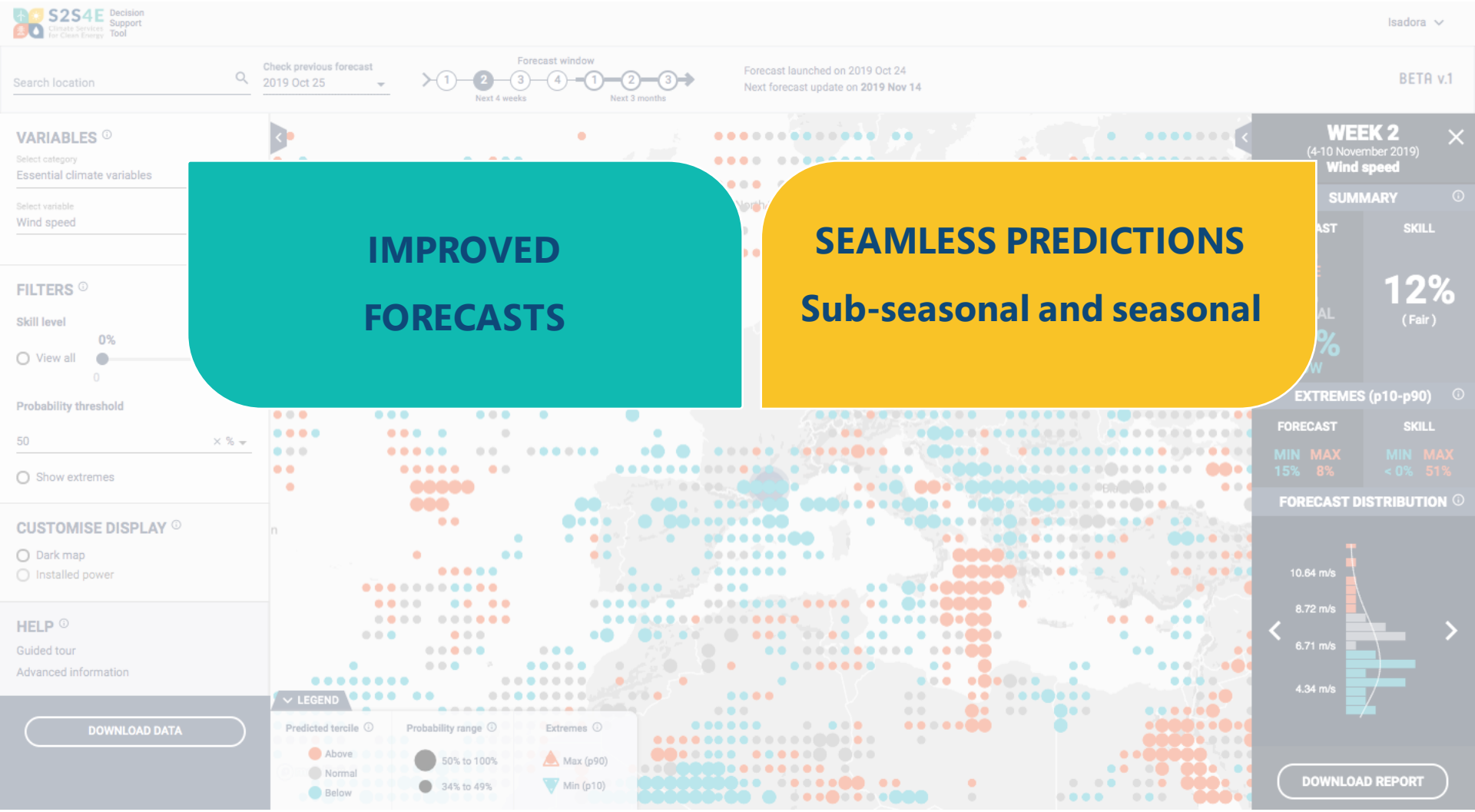
S2S4E Climate Services for Clean Energy

Decision Support Tool



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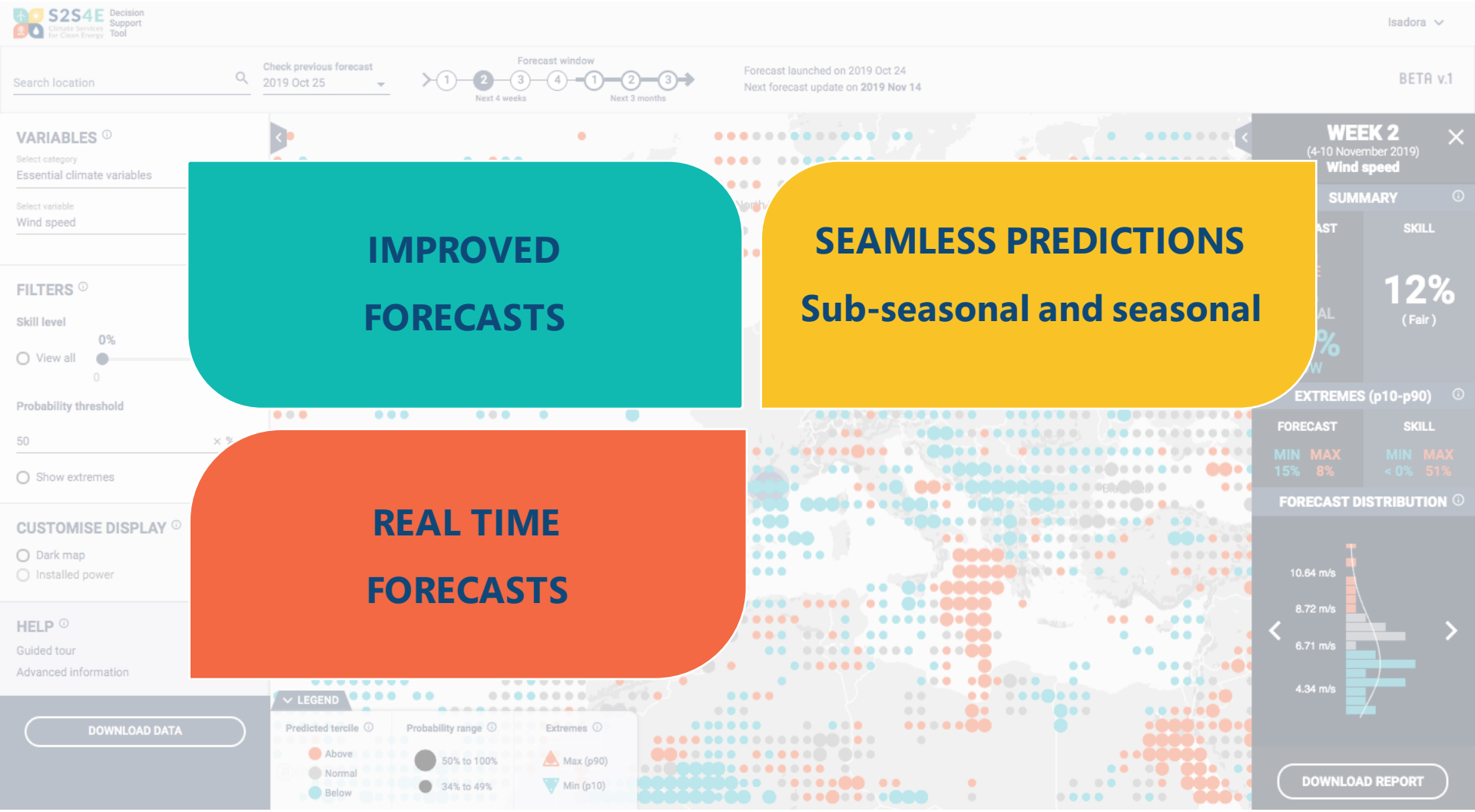
Decision Support Tool



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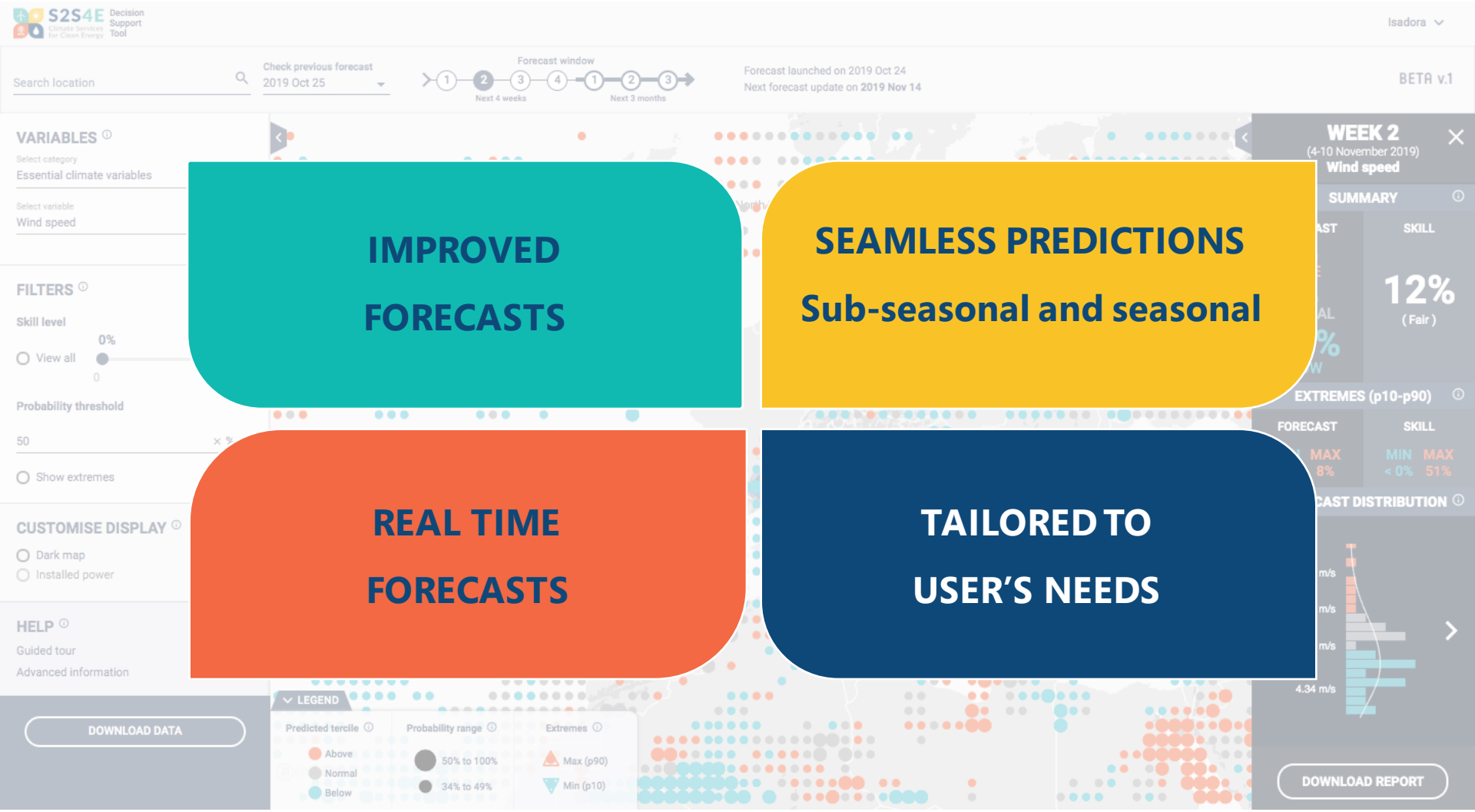

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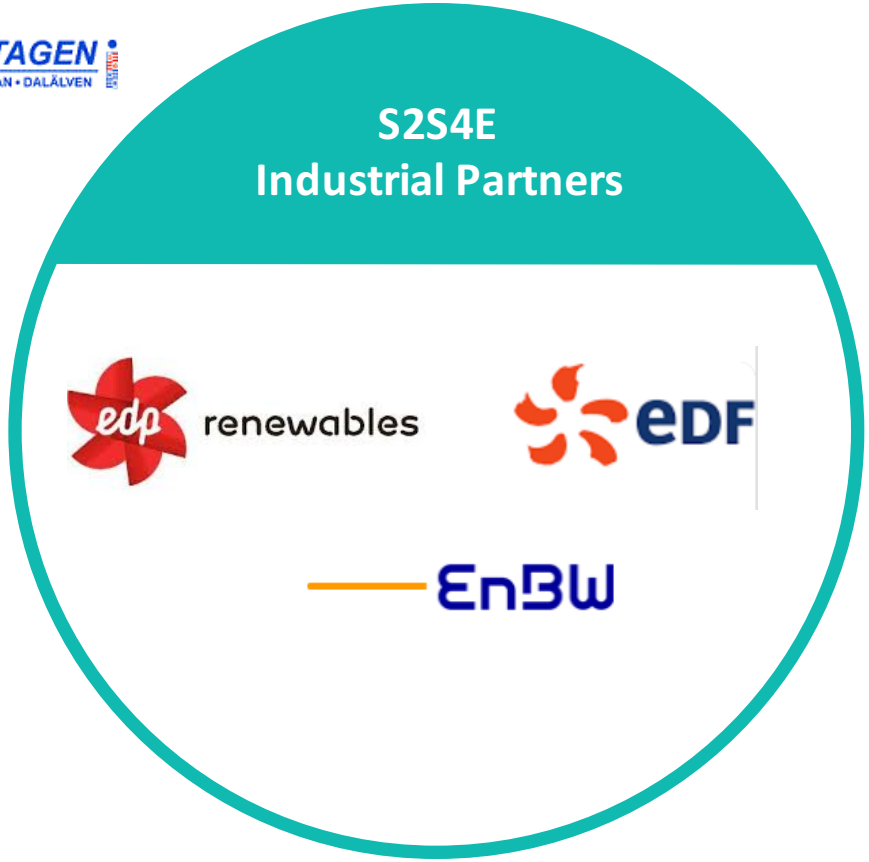
Coproduction with industrial partners…



VATTENREGLERINGSFÖRETAGEN
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IBERDROLA RENOVABLES

RED ELÉCTRICA DE ESPAÑA

edp renewables

eDF

gasNatural fenosa

МЕПСО
МАКЕДОНСКИ ЕЛЕКТРОПРЕНОСЕН СИСТЕМ ОПЕРАТОР

EnBW

Rte

VATTENFALL

…and external stakeholders

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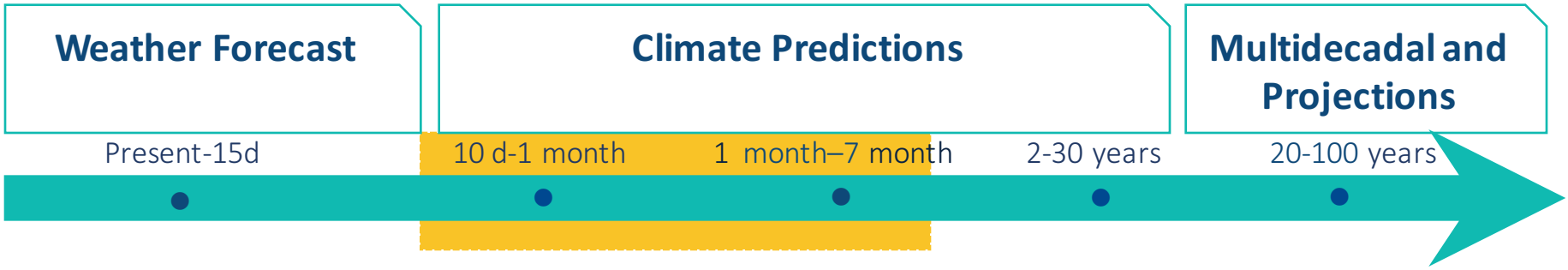

Applications for wind/solar/hydro generation

Post-construction decisions

Energy producers: commit energy sales for next day

Grid operators: Market prices and grid balance

Energy traders: Anticipate energy prices

Plant operators: planning for cleaning and maintenance

Post-construction decisions

Energy producers: Resource management strategies

Energy traders: Resource effects on markets

Plant operators: Planning for maintenance works, especially offshore wind O&M

Plant investors: anticipate cash flow, optimize return on investments

Pre-construction decisions

Power plant developers: Site selection. Future risks assessment.

Investors: Evaluate return on investments

Policy-makers: Asses changes to energy mix

River-basin managers: understand changes to better manage the river flow

Applications for demand

Daily operation decisions

Grid operators: Anticipate hot/cold days. Schedule power plants to reinforce supply.

Energy traders: Anticipate energy prices.

Mid-term planning

Grid operators: Anticipate hotter/colder seasons Schedule power plants to reinforce supply.

Energy traders: Anticipate energy prices.

Long-term planning

Grid operators: Anticipate addition of more capacity. Adaptation of transmission lines

Policy-makers: Plan addition of more capacity. Understand changes to energy mix

Is this useful for other sectors?

e.g. Agriculture (wine)

Time scale	Decision type	Challenges	MED-GOLD climate services tools	Benefits
Short-term (e.g., 30 days)	Agro-management	• Optimize pest treatments • Optimize irrigation planning	• Temperature • Precipitation • Numerical modelling of pests and evapotranspiration • Insolation	• Reduce pest damage while protecting the environment • Optimize the use of water resources
	Quality management	• Better estimate pest affectation and frost damages • Correct olive formation		• Optimize olive and olive oil quality
Mid-term (e.g., 6 months)	Agro-management	• Optimize fertilization planning • Optimize irrigation planning	• Temperature • Precipitation • Numerical modelling of productivity	• Sustainability • Optimization of the use of fertilizers
	Stock management	• Better estimation of olive production • Improve the selling process		• Improve stock and selling planning

https://www.med-gold.eu/

...The purpose of this workshop is to find out

Hands-on session

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Thank you

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Public reports will be available for download on our website:
www.s2s4e.eu

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